

# TABLE OF CONTENTS

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Section 5	Environmental Information .....	5.16-1
5.16	Public Health.....	5.16-1
5.16.1	Affected Environment.....	5.16-2
5.16.1	Environmental Consequences.....	5.16-4
5.16.1.1	Significance Criteria.....	5.16-4
5.16.1.2	Construction Phase Effects.....	5.16-5
5.16.1.3	Operational Phase Effects .....	5.16-5
5.16.1.4	Public Health Effect Study Methods .....	5.16-7
5.16.1.5	Characterization of Risks from Toxic Air Pollutants .....	5.16-8
5.16.1.6	Hazardous Materials.....	5.16-11
5.16.1.7	Operation Odors .....	5.16-12
5.16.1.8	Electromagnetic Field Exposure .....	5.16-12
5.16.1.9	Legionella.....	5.16-12
5.16.1.10	Summary of Effects.....	5.16-14
5.16.2	Cumulative Effects.....	5.16-14
5.16.3	Mitigation Measures .....	5.16-14
5.16.3.1	Criteria Pollutants.....	5.16-14
5.16.3.2	Toxic Pollutants.....	5.16-14
5.16.3.3	Hazardous Materials.....	5.16-14
5.16.4	Laws, Ordinances, Regulations, and Standards .....	5.16-15
5.16.4.1	Permits Required and Schedule.....	5.16-17
5.16.4.2	Agencies Involved and Agency Contacts.....	5.16-17
5.16.5	References.....	5.16-19

## Tables

Table 5.16-1	Nearest Sensitive Receptors By Receptor Type
Table 5.16-2	Top 10 Toxic Air Contaminants for the SCAB
Table 5.16-3	Chemical Substances Potentially Emitted to the Air from the Project
Table 5.16-4	Toxicity Values Used to Characterize Health Risks (Inhalation)
Table 5.16-5	Health Effects Significant Threshold Levels for SCAQMD
Table 5.16-6	Project HRA Summary
Table 5.16-7	Summary of LORS – Public Health
Table 5.16-8	Summary of Agency Contacts for Public Health

## TABLE OF CONTENTS

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## **5.16 PUBLIC HEALTH**

This section presents the methodology and results of a human Health Risk Assessment (HRA) performed to assess potential effects and public exposure associated with airborne emissions from the routine operation of the Watson Cogeneration Steam and Electric Reliability Project (Project). Section 5.16.1 describes the affected environment. Section 5.16.2 discusses the environmental consequences from the operation of the power facility and associated facilities. Section 5.16.3 discusses cumulative effects. Section 5.16.4 discusses mitigation measures. Section 5.16.5 presents applicable laws, ordinances, regulations, and standards (LORS), permit requirements, schedules, and agency contacts. Section 5.16.5 contains references cited or consulted in preparing this section.

Watson Cogeneration Company (Applicant) is proposing to construct and operate a nominal 85 megawatt (MW) combustion turbine based cogeneration facility located in Los Angeles County, California. The proposed new turbine installation will be constructed on the existing Watson facility site which is located at the BP Carson Refinery. The expansion Project will consist of the following major components.

- Installation of a nominal 85 MW General Electric (GE) 7EA combustion turbine generator (CTG).
- Installation of heat recovery steam generator (HRSG) with supplemental duct firing rated at approximately 659,000 lbs steam/hr.
- Installation of two additional cells to the existing seven cell wet cooling tower to provide additional cooling and heat rejection capacity for the power block process, as well as changing the source of the water to the existing cell tower.
- Installation of all required auxiliary support systems.

Air will be the dominant pathway for public exposure to chemical substances released by the Project. Emissions to the air will consist primarily of combustion by-products produced by the new combustion turbine and the two additional cells on the existing cooling tower. Potential health risks from combustion emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways were included in the health risk modeling, however, direct inhalation is considered the most likely exposure pathway. The HRA was conducted in accordance with guidance established by the California Office of Environmental Health Hazard Assessment (OEHHA) and the California Air Resources Board (CARB).

Combustion byproducts with established California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS), including nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and fine particulate matter (PM<sub>10</sub>/PM<sub>2.5</sub>) are addressed in Section 5.2, Air Quality. However, some discussion of the potential health risks associated with these substances is presented in this section. Human health risks associated with the potential accidental release of stored acutely hazardous materials are discussed in Section 5.12, Hazardous Materials Handling.

### 5.16.1 Affected Environment

As proposed by the Applicant, the Project is situated on the site of the existing Watson Cogeneration Facility (Figure 3-1, Regional Map), which has been providing process steam and electric power to the adjacent BP Carson Refinery (BP Refinery) for over 20 years.

The Project Site is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within the 428-acre parcel further described as Assessors Parcel Number (APN) 7315-006-003, 1801 Sepulveda Boulevard, Carson, California, 90745, and is integral to the existing BP Refinery. The street address of the Project Site is located within the boundary of the existing Watson Cogeneration Facility at 22850 South Wilmington Avenue, Carson, California. Figure 3-1, Regional Map, depicts the Project Site and surrounding area. An existing warehouse/maintenance shop on a portion of the site will be removed as part of the Project. The Project Site is located approximately 0.7 miles south of the 405 Freeway, roughly bounded by Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east.

The Project Site elevation is approximately 32 feet above mean sea level. Because the site is located within the existing refinery property boundary, the Project Site and surrounding areas are highly developed, and have been subject to disturbance for many years.

The Project's primary objective is to provide additional process steam in response to the refinery's process steam demand. The Project complements the existing cogeneration facility located within the confines of the refinery. The existing facility has four GE 7EA CTGs, four HRSGs, and two steam turbine generators. The Project consists of adding a fifth CTG/HRSG to the existing configuration and is referred to as the "fifth train."

The Construction Laydown and Parking Area is a paved 25-acre parcel located approximately 1 mile southeast of the Project Site, at the northeast corner of East Sepulveda Boulevard and South Alameda Street. The area is owned by BP and is currently used as a truck parking and staging area.

No off-site improvements, such as water supply, natural gas, or wastewater pipelines, associated with the Project are currently planned. The Project will connect to the existing supply pipelines currently located at the facility.

The site Universal Transverse Mercator (UTM) coordinates are as follows: 384888.6mE, 3742329mN, Zone 11 (NAD27).

The site is situated in census tract 5439.04. Figures O-1, Sensitive Receptor Map and O-2, Census Tracts in the Immediate Impact Area (Appendix O, Public Health) show the site, sensitive receptor locations, and surrounding census tracts. The Census Findings table (Appendix O, Public Health) presents a summary of data for each identified census tract adjacent to the site.

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Schools, both public and private, day care facilities, convalescent homes, and hospitals are of particular concern. Appendix O, Public Health, presents a detailed listing of sensitive receptors. The nearest sensitive receptors based upon receptor type are listed in Table 5.16-1, Nearest Sensitive Receptors By Receptor Type. Appendix O, Public Health, delineates data on the population by census tract.

**Table 5.16-1**  
**Nearest Sensitive Receptors By Receptor Type**

Receptor ID	Receptor Type	UTM Coordinates (E/N), m
Nearest Residence	Residence	384992, 3743377
Nearest School <sup>1</sup>	School	383565, 3743700
Nearest Hospital	Hospital	380518, 3744036
Nearest Daycare	Daycare Center	387340, 3744786
Nearest Convalescent Home	Convalescent Home	390410, 3741289
Nearest Worker (off-site)	Off-site Worker	384635, 3742588

Source: All coordinates from Google Earth (center location of each receptor location), converted to NAD27.

<sup>1</sup> The nearest school is approximately 6,200 feet from the site, therefore no SCAQMD Rule 212 notifications are required.

Air quality and health risk data presented by CARB in the 2006 Almanac of Emissions and Air Quality for the state shows that over the period from 1990 through 2005, the average concentrations for the top 10 toxic air contaminants (TACs) have been substantially reduced, and the associated health risks for the state are showing a steady downward trend as well. This same trend is expected to have occurred in the South Coast Air Basin (SCAB). CARB-estimated emissions inventory values for the top 10 TACs for 2005 are presented in Table 5.16-2, Top 10 Toxic Air Contaminants for the SCAB.

**Table 5.16-2**  
**Top 10 Toxic Air Contaminants for the SCAB**

TAC	SCAB Year 2005 Emissions (tons/yr)	Annual Average Concentration <sup>1</sup>	Predicted Cancer Risk <sup>1</sup> , per 10 <sup>6</sup>
Acetaldehyde	1,743	1.19 ppb	6
Benzene	3,606	0.554 ppb	51
1,3 Butadiene	695	0.144 ppb	54
Carbon tetrachloride	0.24	ND	ND
Chromium 6	0.16	0.09 µg/m <sup>3</sup>	14
Para-Dichlorobenzene	1,004	0.15 ppb	10
Formaldehyde	4,623	2.78 ppb	20
Methylene Chloride	3,505	0.24 ppb	<1
Perchloroethylene	2,012	0.57 ppb	2
Diesel PM	7,746	ND	ND

Source: California Almanac of Emissions and Air Quality-2006, CARB-PTSD.

Notes:

<sup>1</sup> Data for North Long Beach monitoring station for 2004.

ND = no data

µg/m<sup>3</sup> = micrograms per cubic meter

PM = particulate matter

### 5.16.1 Environmental Consequences

#### *5.16.1.1 Significance Criteria*

##### *Cancer Risk*

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are not assumed to have a threshold below which there would be no human health effect. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under various state and local regulations, an incremental cancer risk greater than 10 in a million due to a project is considered to be a significant effect on public health. For example, the 10 in a million risk level is used by the Air Toxics Hot Spots (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

##### *Non-Cancer Risk*

Non-cancer health effects can be classified as either chronic or acute. In determining the potential health risks of non-cancerous air toxics, it is assumed there is a dose of the chemical of concern below which there would be no effect on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this HRA, all hazard quotients were summed regardless of target organ. This method leads to a conservative, upper-bound assessment. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated June 2008 (see Table O-7 Consolidated Table of OEHHR/ARB Approved Risk Assessment Health Values Appendix O, Public Health).

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the exposure duration is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. One-hour average concentrations are divided by acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposure to air toxics.

## 5.16.1.2 Construction Phase Effects

The construction phase of the Project is expected to take approximately 20 months (followed by 6 months of startup and commissioning). No significant public health effects are expected during the construction phase. Strict construction practices that incorporate safety and compliance with applicable LORS will be followed (see Section 5.16.5). In addition, mitigation measures to reduce air emissions from construction effects will be implemented as described in Section 5.2, Air Quality.

Temporary emissions from construction-related activities are discussed in Section 5.2, Air Quality. Ambient air modeling for particulate matter less than 10 microns in aerodynamic diameter (PM<sub>10</sub>), CO, sulfur dioxide (SO<sub>2</sub>), and NO<sub>x</sub> was performed as described in Section 5.2, Air Quality. Construction-related emissions are temporary and localized, resulting in no long-term effects to the public.

Small quantities of hazardous waste may be generated during the construction phase of the Project. Hazardous waste management plans will be in place so the potential for public exposure is minimal. Refer to Section 5.14, Waste Management, for more information. No acutely hazardous materials will be used or stored on-site during construction (see Section 5.15, Hazardous Materials Handling). To ensure worker safety during construction, safe work practices will be followed (Section 5.17, Worker Safety).

## 5.16.1.3 Operational Phase Effects

Environmental consequences potentially associated with the operation of the Project are potential human exposure to chemical substances emitted to the air. The human health risks potentially associated with these chemical substances were evaluated in a HRA. The chemical substances potentially emitted to the air from the Project turbine/HRSG and cooling tower cells are listed in Table 5.16-3, Chemical Substances Potentially Emitted to the Air from the Project.

**Table 5.16-3**  
**Chemical Substances Potentially Emitted to the Air from the Project**

Criteria Pollutants
Particulate Matter
Carbon Monoxide
Sulfur Oxides
Nitrogen Oxides
Volatile Organic Compounds
Lead

**Table 5.16-3**  
**Chemical Substances Potentially Emitted to the Air from the Project**

Criteria Pollutants
Noncriteria Pollutants (Toxic Pollutants)
Ammonia
PAHs
Acetaldehyde
Acrolein
Benzene
1-3 Butadiene
Ethylbenzene
Formaldehyde
Hexane (n-Hexane)
Naphthalene
Propylene
Propylene Oxide
Toluene
Xylene
Arsenic
Aluminum
Cadmium
Chromium VI
Copper
Iron
Mercury
Manganese
Nickel
Silver
Zinc

Emissions of criteria pollutants will adhere to NAAQS and CAAQS as discussed in Section 5.2, Air Quality. The Project also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under South Coast Air Quality Management District (SCAQMD) rules. Offsets will be required because the Project will be a major modification to an existing major source. Finally, air dispersion modeling results (presented in Section 5.2, Air Quality) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS). These standards are intended to protect the general public with a wide margin of safety. Therefore, the Project is not anticipated to have a significant effect on public health from emissions of criteria pollutants.

Potential effects associated with emissions of toxic pollutants to the air from the Project were addressed in an HRA, presented in Appendix O, Public Health. The HRA was prepared using guidelines developed by OEHHA and CARB, as implemented in the latest version of the Hotspots Analysis and Reporting Program (HARP) model (Version 1.4a). As an input into HARP, the HARP On-Ramp preprocessor (as compiled by CARB on 3 February 2009) was used to convert the AERMOD model output into a suitable format for HARP.

#### 5.16.1.4 Public Health Effect Study Methods

Emissions of toxic pollutants potentially associated with the Project were estimated using emission factors approved by CARB and the U.S. Environmental Protection Agency (USEPA). Concentrations of these pollutants in air potentially associated with Project emissions were estimated using the HARP dispersion modeling module. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in an HRA, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in the air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the maximum impact receptor (MIR). The hypothetical MEI is an individual assumed to be located at the MIR location, which is a residential receptor where the highest concentrations of air pollutants associated with Project emissions are predicted to occur, based on the air dispersion modeling. Human health risks associated with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in air at the MIR location, it is unlikely that there would be significant effects in any location in the vicinity of the Project. The highest concentration location represents the MIR.

Health risks potentially associated with concentrations of carcinogenic air pollutants were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of  $1 \mu\text{g}/\text{m}^3$  over a 70-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in the air over a 70-year lifetime. Evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in the air was performed by comparing modeled concentrations in air with the RELs. An REL is a concentration in the air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in the air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in the air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB, 2/2009), and are presented in Table 5.16-4, Toxicity Values Used to Characterize Health Risks (Inhalation).

**Table 5.16-4  
Toxicity Values Used to Characterize Health Risks (Inhalation)**

Compound	Unit Risk Factor ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Chronic Reference Exposure Level ( $\mu\text{g}/\text{m}^3$ )	Acute Reference Exposure Level ( $\mu\text{g}/\text{m}^3$ )
Ammonia	-	200	3,200
Acetaldehyde	0.0000027	9.0	-
Acrolein	-	0.06	0.19

**Table 5.16-4**  
**Toxicity Values Used to Characterize Health Risks (Inhalation)**

Compound	Unit Risk Factor ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Chronic Reference Exposure Level ( $\mu\text{g}/\text{m}^3$ )	Acute Reference Exposure Level ( $\mu\text{g}/\text{m}^3$ )
Benzene	0.000029	60	1,300
1-3 Butadiene	0.00017	20	-
Ethylbenzene	0.0000025	2,000	-
Formaldehyde	0.000006	3	94
Hexane	-	7,000	-
Naphthalene	0.000034	0	-
PAHs (as BaP)	0.0011	-	-
Propylene	-	3,000	-
Propylene Oxide	.0000037	30	3,100
Toluene	-	300	37,000
Xylene	-	700	22,000
Arsenic	0.0033	0.03	0.19
Aluminum	-	-	-
Cadmium	0.0042	0.02	-
Chromium VI	0.15	0.002	-
Copper	-	-	100
Iron	-	-	-
Lead	0.000012	-	-
Mercury	-	0.09	1.8
Manganese	-	0.2	-
Nickel	0.00026	0.05	6
Silver	-	-	-
Zinc	-	-	-

Source: CARB/OEHHA, 6/2008.

Note:

$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter

Emissions of the various toxic and/or hazardous air pollutants are delineated in detail in Appendix I, Air Quality Data.

#### 5.16.1.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the Project MIR location is estimated to be  $7.00 \times 10^{-7}$ . Excess lifetime cancer risks less than  $1 \times 10^{-6}$  are unlikely to represent significant public health effects that require additional controls of facility emissions. Risks higher than  $1 \times 10^{-6}$  may or may not be of concern, depending upon several factors. These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population, and toxicity of the risk-driving chemicals. Health effects risk thresholds are listed in Table 5.16-5, Health Effects Significant Threshold Levels for SCAQMD. Risks associated with pollutants potentially emitted from the Project are presented in Table 5.16-6, Project HRA Summary. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix O, Public Health. As

described previously, human health risks associated with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in air at the MIR location, it is unlikely that there would be significant effects in any other location in the vicinity of the Project.

**Table 5.16-5**  
**Health Effects Significant Threshold Levels for SCAQMD**

<b>Risk Category</b>	<b>Risk Threshold</b>
Cancer Risk	1 per million w/o T-BACT <i>10 per million with T-BACT</i>
Acute Hazard Index	<= 1.0
Chronic Hazard Index	<= 1.0
Cancer Burden	<= 0.5

Source: Per SCAQMD Rule 1401.

Note:

T-BACT = Toxic Best Available Control Technology

**Table 5.16-6**  
**Project HRA Summary**

<b>Risk Category</b>	<b>Project Values</b>	<b>Turbine and Cooling Tower</b>
		<b>Applicable Significance Threshold</b>
Cancer Risk	$7.00 \times 10^{-7}$	$10.0 \times 10^{-6}$ with T-BACT
Chronic Hazard Index	0.0297	1.0
Acute Hazard Index*	0.00288	1.0
Cancer Burden	$\sim 0.0032^1$	0.5

Source: Watson Cogeneration Steam and Electric Reliability Project Team, 2009.

Notes:

<sup>1</sup> MIR effect area lies within Tract 5430.04, with a total population of ~4500.

\*at the maximum acute impact receptor.

T-BACT = Toxic Best Available Control Technology

Cancer risks potentially associated with facility emissions also were assessed in terms of cancer burden. Cancer burden is a hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the Project. Cancer burden is calculated as the worst-case product of excess lifetime cancer risk and the number of individuals at that risk level. A worst-case estimate of cancer burden was calculated based on the following assumptions.

The MIR concentration was applied to all affected portions of identified census tracts within the radius area defined by the distance to the highest (MIR) concentration. A detailed listing and map of affected census tracts and year 2000 population estimates are provided in Appendix O, Public Health. This procedure results in a conservatively high estimate of cancer burden. The calculated cancer burden for the Project is  $\sim 0.0032$ .

As described previously, human health risks associated with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. Therefore, the risks for all of these individuals would be lower (and in most cases, substantially lower) than  $7.00 \times 10^{-7}$ . The estimated cancer burden was  $\sim 0.0032$ , indicating that emissions from the Project would not be associated with any increase in cancer cases in the previously defined population. In addition, the cancer burden is less than the Rule 1401 threshold values. As stated previously, the methods used in this calculation considerably overstate the potential cancer burden, further suggesting that Project emissions are unlikely to represent a significant public health effect in terms of cancer risk.

The acute non-cancer hazard quotient associated with concentrations in air is shown in Table 5.16-6, Project HRA Summary. The acute non-cancer hazard quotients for all target organs fall below 1.0. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant effect to public health. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix O, Public Health. As described previously, human health risks associated with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant effect associated with concentrations in the air at the MIR location, it is unlikely that there would be significant effects in any other location in the vicinity of the Project.

Detailed risk and hazard values are provided in the HARP output presented in Appendix O, Public Health.

The estimates of excess lifetime cancer risks and non-cancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans. In other words, the assumption is that humans are as sensitive as the most sensitive animal species. Therefore, the true risk is not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero.

An excess lifetime cancer risk of  $1 \times 10^{-6}$  is typically used as a screening threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of  $1 \times 10^{-6}$ , which has historically been judged to be an acceptable risk, originates from efforts by the Food and Drug Administration to use quantitative HRA for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt, 1985). The associated dose, known as a “virtually safe dose,” has become a standard used by many policy makers and the lay public for evaluating cancer risks. However, a study of regulatory actions pertaining to carcinogens found that an acceptable risk level can often be determined on a case-by-case basis. This analysis of 132 regulatory decisions, found that regulatory action was not taken to control estimated risks below  $1 \times 10^{-6}$  (one in a million), which are called de minimis risks. De minimis risks are historically considered risks of no regulatory concern. Chemical exposures with risks above  $4 \times 10^{-3}$  (four in ten thousand), called de manifestis risks, were consistently regulated. De manifestis risks are typically risks of regulatory concern. The

risks falling between these two extremes were regulated in some cases, but not in others (Travis et al 1987).

The estimated lifetime cancer risks to the maximally exposed individual located at the Project MIR are well below the  $1 \times 10^{-6}$  significance level, and the aggregated cancer burden associated this risk level is less than 1.0 excess cancer case. In addition, the cancer burden is less than the Rule 1401 threshold value. These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the Project emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstates the risks from Project emissions. Based on the results of this HRA, there are no significant public health effects anticipated from emissions of toxic pollutant to the air from the Project.

#### **5.16.1.6 Hazardous Materials**

Hazardous materials will be used and stored at the Project Site. The hazardous materials stored in significant quantities on-site and descriptions of their uses are presented in Section 5.15, Hazardous Materials Handling. Use of chemicals at the Project Site will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant effects to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate off-site could result in potential effects to the public.

The California Accidental Release Program regulations (CalARP) and Code of Federal Regulations (CFR) Title 40 Part 68 under the Clean Air Act establish emergency response planning requirements for acutely hazardous materials. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program listed hazardous material. Any RMP-listed materials proposed to be used at the Project are discussed in Section 5.15, Hazardous Materials Handling.

The proposed new turbine/HRSG Selective Catalytic Reduction (SCR) system will use the existing on-site ammonia storage and distribution systems. No new storage tanks for substances such as ammonia for the SCR system will be installed for the new turbine/HRSG. An off-site consequence analysis has been previously performed to assess potential risks to off-site human populations if a spill were to occur. Results of this analysis have been reported to EPA as well as the local RMP administering agency. A summary of these results is presented below, and a copy of the RMP Submit filing is included in Appendix O, Public Health.

RMP off-site consequence analysis summary data:

- Anhydrous ammonia
- 147,917 lbs. maximum tank capacity
- Gas liquefied by pressure
- Worst case release quantity is 117,200 lbs, 10 minute release (tank rupture)
- Class F stability, 1.5 m/sec wind speed
- Distance to toxic endpoint (TE) of 201 parts per million (ppm) is 3.6 miles

- Estimated exposed population within TE distance is 259,270 people
- Alternate case release quantity is 24,750 lbs, 10 minute release (transfer hose failure)
- Class D stability, 1.5 m/sec wind speed
- Distance to TE of 201 ppm is 0.5 miles
- Estimated exposed population within TE distance is 0 people
- No incidents in the past 5 years with on-site or off-site effects involving ammonia

#### ***5.16.1.7 Operation Odors***

The Project is not expected to emit or cause to be emitted any substances that could cause odors.

#### ***5.16.1.8 Electromagnetic Field Exposure***

Electromagnetic fields (EMFs) occur independently of one another as electric and magnetic fields at the 60- Hertz frequency used in transmission lines, and both are created by electric charges. Electric fields exist when these charges are not moving. Magnetic fields are created when the electric charges are moving. The magnitude of both electric and magnetic fields falls off rapidly as the distance from the source increases (proportional to the inverse of the square of distance).

Because the electric transmission line does not travel through residential areas, and based on recent findings of the National Institute of Environmental Health Sciences (NIEHS 1999), EMF exposures are not expected to result in a significant effect on public health. The NIEHS report to the U.S. Congress found that “the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm” (NIEHS 1999).

California does not presently have a regulatory level for magnetic fields. However, the values estimated for the Project are well below those established by states that do have limits. Other states have established regulations for magnetic field strengths that have limits ranging from 150 milligauss to 250 milligauss at the edge of the right-of-way, depending on voltage. The California Energy Commission does not presently specify limits on magnetic fields for 230kV transmission lines.

#### ***5.16.1.9 Legionella***

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth to occur in the cooling tower cells, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires’ Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling tower cells and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water for use in cooling tower cells in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation applies to the Project since it intends to use reclaimed water for cooling purposes.

The USEPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The USEPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling tower cells can aid in the transmission of Legionella from water to air. The USEPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In 2000, the Cooling Tower Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60 percent of industrial cooling tower cells tested were found to contain Legionella. To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leaks into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling tower cells, and the overall general control of microbiological populations. Good preventive maintenance is very important in the efficient operation of cooling tower cells and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. The efficacy of any biocide in ensuring that bacteria, and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures, and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, an appropriate biocide program and anti-biofilm agent monitoring program would be prepared and implemented for the entire cooling tower, including the two new cooling tower cells associated with this Project. These programs would ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. The mitigation measure which is presented in Section 5.16.4.6 would reduce the chances of Legionella growing and dispersing to insignificant (RSA 2008).

#### *5.16.1.10 Summary of Effects*

Results from the air toxics HRA based on emissions modeling indicate that there will be no significant incremental public health risks from construction or operation of the Project. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of NO<sub>2</sub>, CO, SO<sub>2</sub>, and PM<sub>10</sub> will not significantly affect air quality (Section 5.2, Air Quality). Potential concentrations are below the federal and California standards established to protect public health, including the more sensitive members of the population.

#### **5.16.2 Cumulative Effects**

The HRA for the Project indicates that the maximum cancer risk will be approximately  $7.00 \times 10^{-7}$ , versus a significance threshold of 10.0 in one million with T-BACT at the point of maximum exposure to air toxics from power facility emissions. This risk level is considered to be insignificant. Non-cancer chronic and acute effects will also be less than significant. Therefore, the risk of effects from the Project combining with effects from other past, present, and reasonably foreseeable future projects to make a significant effect are also very low. A cumulative health risk effect analysis is not proposed at this time due to the low emissions and low risks from the Project.

#### **5.16.3 Mitigation Measures**

##### *5.16.3.1 Criteria Pollutants*

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the Project. BACT for the turbine and new cooling tower cells is delineated in Appendix I, Air Quality Data.

The Project location is in an area that is designated by the federal air agencies as non-attainment for ozone and non-attainment for particulate matter. Pursuant to SCAQMD New Source Review Rule, offsets are required for the Project. Therefore, further mitigation of emissions is not required to protect public health.

##### *5.16.3.2 Toxic Pollutants*

Emissions of toxic pollutants to the air will be minimized through the use of BACT/T-BACT at the Project.

#### **PH-1: Legionella Mitigation Measure**

The Project will develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Plan will be consistent with the CTI's "Best Practices for Control of Legionella" guidelines and will include sampling and testing for the presence of Legionella bacteria at appropriate intervals (RSA 2008).

##### *5.16.3.3 Hazardous Materials*

Mitigation measures for hazardous materials are presented below and discussed in more detail in Section 5.15, Hazardous Materials Handling. Potential public health effects from the use of hazardous materials are only expected to occur as a result of an accidental release. The facility

has many safety features designed to prevent and minimize effects from the use and accidental release of hazardous materials. The Project Site will include the design features listed below.

- Curbs, berms, and/or secondary containment structures will be provided where accidental release of chemicals may occur.
- A fire-protection system will be included to detect, alarm, and suppress a fire, in accordance with applicable LORS.
- Construction of all storage systems will be in accordance with applicable construction standards and LORS.

If required, the existing RMP for the facility will be revised prior to commencement of Project operations. The RMP will estimate the risk presented by handling affected materials at the Project Site. The RMP will include a hazard analysis, off-site consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on: (1) the proper use of personal protective equipment, (2) safety operating procedures, (3) fire safety, and (4) emergency response actions. The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for Project personnel include power facility evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either a collection sump or to holding or neutralization tanks. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

#### **5.16.4 Laws, Ordinances, Regulations, and Standards**

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to the Project are identified in Table 5.16-7, Summary of LORS – Public Health. The conformity of the Project to each of the LORS applicable to public health is also presented in this table, as well as references to the selection locations within this report where each of these issues is addressed. Table 5.16-7, Summary of LORS – Public Health also summarizes the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies.

**Table 5.16-7  
Summary of LORS – Public Health**

<b>LORS</b>	<b>Applicability</b>	<b>Primary Regulatory Agency</b>	<b>Project Conformance</b>	<b>Conformance (AFC Section)</b>
Federal Clean Air Act Title III	Public exposure to air pollutants	USEPA Region 9 CARB SCAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. Emissions of criteria pollutants will be minimized by applying BACT to the Project.	5.16.1.5, and Appendix O
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986— Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings.	5.16.1.5, 5.16.1.6, 5.16.3.3, and Appendix O
40 CFR Part 68 (Risk Management Plan) and CalARP Program Title 19	Public exposure to acutely hazardous materials	USEPA Region 9 Los Angeles County Department of Health Services Los Angeles County Fire Department	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank. An RMP (if required) will be prepared prior to commencement of Project operations.	5.16.1.6, and Appendix O, Section 5.15
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	Los Angeles County Department of Health Services CARB SCAQMD	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank.	5.16.1.6, and Appendix O, Section 5.15
CHSC 25500-25542	Hazmat Inventory	State Office of Emergency Services and Los Angeles County Department of Environmental Health	Prepare all required HazMat plans and inventories, distribute to affected agencies	Section 5.15
CHSC 44300 et seq.	AB2588 Air Toxics Program	SCAQMD	Participate in the AB2588 inventory and reporting program at the District level.	Appendix I-A, Appendix O, initial reporting TBD by SCAQMD
SCAQMD Rule 1401	Toxics NSR	SCAQMD	Application of BACT and T-BACT, preparation of HRA	5.2.4.2, Section 5.16, Appendix O

**Table 5.16-7  
Summary of LORS – Public Health**

<b>LORS</b>	<b>Applicability</b>	<b>Primary Regulatory Agency</b>	<b>Project Conformance</b>	<b>Conformance (AFC Section)</b>
CHSC 25249.5	Proposition 65	OEHHA	Comply with all signage and notification requirements.	Section 5.15
Health and Safety Code Sections 44360 to 44366 (Air Toxics “Hot Spots” Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB SCAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.	5.16.1, Appendix O

#### **5.16.4.1 Permits Required and Schedule**

Agency-required permits related to public health include an RMP and SCAQMD Permit to Construct/Permit to Operate. These requirements are discussed in detail in Sections 5.15, Hazardous Materials Handling and 5.2, Air Quality, respectively.

#### **5.16.4.2 Agencies Involved and Agency Contacts**

Table 5.16-8, Summary of Agency Contacts for Public Health, provides contact information for agencies involved with Public Health.

**Table 5.16-8  
Summary of Agency Contacts for Public Health**

<b>Public Health Concern</b>	<b>Primary Regulatory Agency</b>	<b>Regulatory Contact</b>
Public exposure to air pollutants	USEPA Region 9	Gerardo Rios Chief, Permits Section USEPA-Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974
	CARB	Mike Tollstrup 1001 I Street, 19 <sup>th</sup> Floor Sacramento, CA 95814 (916) 322-6026
	SCAQMD	Mohsen Nazemi, Dep. EO Permitting/Compliance 21865 E. Copley Dr. Diamond Bar, CA 91765 909-396-2662
Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Cynthia Oshita or Susan Long P.O. Box 4010 Sacramento, CA 95812-4010 (916) 445-6900

**Table 5.16-8**  
**Summary of Agency Contacts for Public Health**

<b>Public Health Concern</b>	<b>Primary Regulatory Agency</b>	<b>Regulatory Contact</b>
Public exposure to acutely hazardous materials	USEPA Region 9	Gerardo Rios Chief, Permits Section USEPA-Region 9 75 Hawthorne St. San Francisco, CA 94105 (415) 947-3974
	Los Angeles County Fire Dept. Hazmat Division	Duty Officer 5825 Rickenbacker Rd. Commerce, CA 90040 (323) 890-4045

Source: Watson Cogeneration Steam and Electric Reliability Project Team, 2008.

**5.16.5 References**

- CARB (California Air Resources Board). 2008. Consolidated table of OEHHA/ARB approved risk assessment health values. (<http://arbis.arb.ca.gov/toxics/healthval/contable.pdf> )
- HARP (Hotspots Analysis and Reporting Program) Express User Manual. Dillingham Software Engineering, Inc., Version 2.07, September 2004.
- HARP (Hotspots Analysis and Reporting Program) User Guide, Version 1.4a. CalEPA-Air Resources Board, December 2003.
- Hutt, P.B. 1985. Use of quantitative risk assessment in regulatory decision making under federal health and safety statutes, in Risk Quantitation and Regulatory Policy. Eds. D.G. Hoel, R.A. Merrill and F.P. Perera. Banbury Report 19, Cold Springs Harbor Laboratory.
- National Institute of Environmental Health Sciences (NIEHS). 1999. Environmental Health Institute report concludes evidence is 'weak' that EMFs cause cancer. Press release. National Institute of Environmental Health Sciences, National Institutes of Health.
- OEHHA/CARB (Office of Environmental Health Hazard Assessment/California Air Resources Board). 2003. Air Toxics Hot Spots Program Risk Assessment Guidelines, CalEPA, August 2003. HARP Model, Version 1.4a, Updated July/08.
- SCAQMD (South Coast Air Quality Management District). 2005. Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics Hot Spots Information and Assessment Act (AB2588). July 2005.
- Travis, C.C., E.A.C. Crouch, R. Wilson and E.D. Klema. 1987. Cancer risk management: A review of 132 federal regulatory cases. Environ. Sci. Technol. 21:415-420.
- Risk Science Associates, Inc., Liberty Energy XXIII-Renewable Energy Power Plant Project, Draft EIR, Public Health Section D.11, Aspen Environmental Group, June 2008.
- Watson Cogeneration Steam and Electric Reliability Project Team. 2008-2009. Fieldwork, observations, and research.



Adequacy Issue:	Adequate	Inadequate	DATA ADEQUACY WORKSHEET	Revision No.	0	Date
Technical Area:	<b>Public Health</b>		Project:	Watson Cogeneration Steam and Electric Reliability Project		
Project Manager:			Docket:			
				Technical Staff:		
				Technical Senior:		

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 5.2.2 – Section 5.2.3.6; pages 5.2-2 through 5.2-16 Section 5.16.1 – Section 5.16.3; pages 5.16-2 through 5.16-15 Appendix I Air Quality Data Appendix O Public Health		
Appendix B (g) (9) (A)	An assessment of the potential risk to human health from the project's hazardous air emissions using the Air Resources Board Hotspots Analysis and Reporting Program (HARP) (HSC §§44360-44366) or its successor and Approved Risk Assessment Health Values. These values should include the cancer potency values and noncancer reference exposure levels approved by the Office of Environmental Health Hazard Assessment (OEHA Guidelines, Cal-EPA 2005).	Section 5.16.1 – Section 5.16.3; pages 5.16-2 through 5.16-15, Appendix O Public Health		
Appendix B (g) (9) (B)	A listing of the input data and output results, in both electronic and print formats, used to prepare the HARP health risk assessment.	Appendix I Air Quality Data Appendix O Public Health Enclosed CD		
Appendix B (g) (9) (C)	Identification of available health studies through the local public health department concerning the potentially affected population(s) within a six-mile radius of the proposed power plant site related to respiratory illnesses, cancers or related diseases.	No such studies identified.		

Adequacy Issue:	Inadequate	Revision No. 0	Date
Technical Area:	<b>Public Health</b>	Project:	Technical Staff:
Project Manager:	Docket:	Reliability Project	Technical Senior:

## DATA ADEQUACY WORKSHEET

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (9) (D)	A map showing sensitive receptors within the area exposed to the substances identified in subsection (g)(9)(A).	Appendix O Public Health (standard 6 mile radius map).		
Appendix B (g) (9) (E)	For purposes of this section, the following definitions apply:			
Appendix B (g) (9) (E) (i)	A sensitive receptor refers to infants and children, the elderly, and the chronically ill, and any other member of the general population who is more susceptible to the effects of the exposure than the population at large;	Section 5.16.1.1; pages 5.16-3 through 5.16-4 Appendix O Public Health		
Appendix B (g) (9) (E) (ii)	An acute exposure is one which occurs over a time period of less than or equal to one (1) hour; and	Section 5.16.1.1; page 5.16-4 Appendix O Public Health		
Appendix B (g) (9) (E) (iii)	A chronic exposure is one which is greater than twelve (12) percent of a lifetime of seventy (70) years.	Section 5.16.1.1; page 5.16-4 Appendix O Public Health		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.16.4; pages 5.16-15 through 5.16-18		

Adequacy Issue:

Adequate

Inadequate

DATA ADEQUACY WORKSHEET

Revision No. 0

Date

Technical Area:

Public Health

Project: Watson Cogeneration Steam and Electric Reliability Project

Technical Staff:

Project Manager:

Docket:

Technical Senior:

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.16.4.2; pages 5.16-17 through 5.16-18		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 5.16.4.2; pages 5.16-17 through 5.16-18		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 5.16.4.1; page 5.16-17 Section 5.2.6.2; page 5.2-45 through 5.2-46.		

